Commercial Fisheries Abstracts

a monthly summary of important developments for the fishery industries

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JOHN L. FARLEY, Director

Commercial Fisheries Abstracts

Prepared in the Branch of Commercial Fisheries

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In addition to the regular abstracts, there is included a bibliography of references of secondary importance (without abstracts). These may be cut off on the lines designated and pasted on standard 3 x 5-inch cards for filing.

Following is a brief outline of this filing system. The numbers apply to the first digit appearing on each card. For the meaning of subsequent digits, please see the above described leaflet.

0	General and theoretical	5	Vitamins
1	Fish by species	6	Fishery byproducts
2	Fresh fish	7	Analytical Methods
3	Preserved fish	8	Composition
4	Oils	9	Miscellaneous

Issued with the approval of the Bureau of the Budget, December 29, 1953

0.31 THE SYNTHESIS OF SQUALENE

Trippett, S. (Department of Organic Chemistry, The University, Leeds, 2)
Chemistry and Industry No. 3, 80 (January 21, 1956)

Introduction.--Squalene isolated from natural sources has the structural formula shown in figure 1. Natural squalene was shown by Langdon & Bloch (1953) to be an intermediate in the biosynthesis of steriods from acetate. Synthetic squalene-like material regenerated from squalene hexahydrochloride or prepared by dehydrobromination of the compound shown in figure 2 could not be used in the biosynthesis of steriods from acetate. These synthetic squalene-like materials were double bond isomers of natural squalene, figure 1, and had infrared spectra different from that of natural squalene.

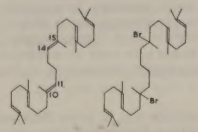

Figure 1 and Figure 2

Object.--The author wishes to report the synthesis of a squalene in which the positions of the double bonds and the infrared spectrum are virtually identical with that of natural squalene.

Experimental.--Tetramethylene bis-triphenyl phosphonium bromide in tetrahydrofuran was treated with 2 molecules of butyl lithium to obtain $Ph_3P{=}CH.CH_2.CH_2.CH{=}PPh_3$. The latter compound plus 2 molecules of geranylacetone yielded, after chromatography and distillation, 35 percent squalene. This squalene had a bath temperature boiling point of 220° C. at 0.2 millimeters of mercury and an index of refraction using the D line of sodium at 21° C (n_D^{21}) of 1.4956. The carbon and

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 ABSTRACTER: Martin Heerdt

1.013 PERUVIAN FISHING INDUSTRY

Anonymous
Commercial Fisheries Review 17, 55-59 (December 1955)

The Peruvian fishing industry has progressed in 15 years from a primitive scale to a present worth of almost 20 million dollars (U.S.). The fishing catch has increased steadily from 12 million pounds in 1939 to 290 million pounds in 1954.

Bonito, tuna, swordfish, and herring landings have shown pronounced increases over the years. Bonito is the most important species landed and is found all along the Peruvian coast. Tuna and swordfish, however, are found only from Paita to the Ecuadorian border in the north and from Mollendo to Chile in the south.

Shrimp have been found near the Ecuador border and a new fishing industry, centered in Puerto Pizarro, has been developed in that area in the last few years. About 500,000 pounds of shrimp were landed in 1954.

Vessels.--Most of the fishing vessels used in Peru before 1940 were open double-bowed boats. In 1949, 577 of the 2,869 fishing boats registered with the Direccion de Capitanias were equipped with motors. It is estimated that the motorized vessels operating in the fisheries now total about 630. A substantial number of purse seiners are included in this figure. A fish pump for unloading fish is reported in operation in the port of Samanco.

Processing facilities.--Refrigeration plants are now available in Paita, Chancay, Callao, and Ilo. These plants include freezing equipment capable of temperatures as low as -40° F. and holding rooms with temperatures of -10° to 0° F. These plants as well as some smaller ones in other ports have ice-making equipment. Total freezing capacity of the private land installations is about 400,000 pounds a day and their holding capacities total over 6 million pounds.

There are at least 50 canneries in Peru, but many of them have been inactive for several seasons or operate sporadically. The capacity of all canneries is about 21,000 cases (48 cans per case) a day,

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 ABSTRACTER: Kathryn L. Osterhaug

1.0111 UNITED STATES AND ALASKA FISHERIES PRODUCTION, 1955

Anonymous
Commercial Fisheries Review 18, 36, 37 (January 1956)

Although the ex-vessel value of the 1955 United States and Alaska fish catch dropped an estimated 10 percent over the $360 million for 1954 the poundage drop is estimated at only about 2 percent. The drop in ex-vessel value was due to sharp declines in the catches of high-priced species, especially salmon, tuna, and halibut. The loss in volume of these varieties was compensated to a large extent by increases in the catches of lower-priced varieties such as whiting, Alaska herring, and a record catch of menhaden.

Menhaden.--Menhaden accounted for almost 40 percent of the total United States and Alaska catch. Menhaden are used for reduction into fish meal and oil. The meal is used in animal feeds and most of the oil is exported to Europe.

Salmon.--The salmon catch was valued at $24 million ex-vessel or $10 million below that of 1954. The catch in 1955 was 286 million pounds as compared with 323 million pounds in 1954.

Shrimp.-- Shrimp is the United States' most valuable fishery on the basis of ex-vessel value. A depressed market and high inventories early in 1955 had a somewhat adverse effect. The 1955 catch was slightly below that of the previous year and the ex-vessel value was also somewhat lower than the $70 million paid in 1954. The market is now practically in balance with demand good and supplies adequate.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

3.19 SCIENTIFIC AND TECHNOLOGICAL PROBLEMS INVOLVED IN USING IONIZING RADIATIONS FOR THE PRESERVATION OF FOOD

Hannan, R. S.
Dep. sci. industr. Res., Lond., Food Investig. spec Rep No. 61, 1955. 192 pp.
Food Science Abstracts 27, 585 (September 1955)

In this report, the present situation and the results so far obtained in the application of ionizing radiations to the preservation of food are reviewed. Part I, entitled Ionizing Radiations: their Production and Properties, is divided into the following chapters: (1) the main properties of the ionizing radiations; (2) the use of electrically-operated generators; (3) the use of waste radiation from Atomic Energy Projects; (4) protection of operators and other personnel; (5) definition and measurement of dose; (6) effects of ionizing radiations on microorganisms; and (7) the effects of irradiation on important constituents of foods. Part II, entitled Treatment of Foods and Associated Materials, contains the following chapters: (8) the sterilization of animal products; (9) sterilization of vegetables and fruits; (10) sterilization of miscellaneous products; (11) incomplete sterilization and other low-dose procedures; and (12) general discussion. The extensive bibliography contains 441 references. Gamma rays, cathode rays, and soft X-rays appear to be potentially the most useful ionizing radiations for use in the food industry, and, although many developmental difficulties have yet to be overcome, the process appears to be economically feasible, particularly for foods of high commercial value that can be treated effectively with low doses. Sterilization of raw foods can be achieved with doses of about 10^6 rep, but this is generally accompanied by adverse effects. Animal products subjected to such doses show objectionable changes of flavor and odor and sometimes of color; these can be controlled to varying extents by procedures involving freezing, de-aeration, or addition of suitable compounds. Furthermore, the irradiated products should preferably be kept in cool storage, since further changes

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SYNTHESIS OF SQUALENE

U.S. FISH PRODUCTION 1955

PERUVIAN FISHERIES

PROBLEMS WITH IONIZING RADIATIONS

1.0111 (Cross Reference: 9.2)

Halibut.--Halibut landings of 37 million pounds were down 6 million pounds from 1954. Several weeks of bad weather during the season curtailed fishing. This fact, coupled with a decline in price, accounts for the drop in ex-vessel value from $8 million in 1954 to $5.4 million in 1955.

Tuna. The catch in 1955 was about 20 percent less than the 323 million pounds taken in 1954. The ex-vessel value is estimated at $35 million compared with $52 million in 1954.

3.19

occur on storage at room temperature. Products of high fat content, in particular, usually show marked changes in flavor. Fruits and vegetables are less adversely affected by irradiation, but softening of texture usually occurs. The adverse effects can be minimized by using doses of 10^5 rep or less, which are useful for eliminating insects in a number of products, preventing sprouting of potatoes, and delaying ripening in fruit to some extent. With slightly higher doses, it may be possible to effect a useful reduction in the numbers of viable microorganisms in many foods without seriously affecting the quality, and thus to increase the storage life under refrigeration of products such as cut meat, or even to sterilize products of low microbial contamination. Medium doses of about 10^5 to 10^6 rep might be used in conjunction with other methods of processing or storage, if damage due to irradiation can be controlled sufficiently; but if irradiation is used on a commercial scale, it is likely to be with low doses. Considerable work is required before positive conclusions are reached with regard to the acceptability of irradiated food for human consumption. Feeding tests with rats and mice have shown no evidence of the formation of acutely toxic substances. Other uses, such as irradiation of packaging materials or empty containers, might also be suggested, but would depend upon economic considerations.

0.31

hydrogen percentage found in the synthetic squalene was as follows: carbon 87.6 percent, hydrogen 12.2 percent and a molecular weight (Rast) of 390. The carbon and hydrogen percentage calculated for the empirical formula $C_{30}H_{50}$ was carbon 87.7 percent, hydrogen 12.3 percent, and a molecular weight of 410, which absorbed 5.9 molecules of hydrogen over a palladium catalyst. The infrared spectrum of the synthetic squalene was found on comparison to be identical with that of natural squalene, n_D^{21} 1.4959 (Kodak Ltd., practical grade purified by chromatography and distillation) except for the presence of a very small peak at 11.3μ. This small peak was probably due to the presence of not more than 3 percent of the isopropenyl form as estimated from the data of Barnard et al.(1950). Treatment with dry hydrogen chloride in acetone at -10° C. produced a mixture of hexahydrochlorides, which was separated into isomers having a melting point of 110°to 113° C. and 145° C. The latter isomer decomposed at 145° C. Each synthetic isomer when mixed with the corresponding isomer obtained from natural squalene gave a melting point identical with the melting point of the synthetic isomer.

The method of synthesis used to make synthetic squalene allows definite allocation of the double bonds. However, the Wittig-Schöllkopf reaction is known to produce a mixture of cis- and trans-isomers. Therefore, there is a possibility that the squalene which was synthesized, may contain isomers showing cis-trans isomerism above the 10:11 and 14:15 double bonds even with an identical infrared spectra. Final proof of the identity of the synthetic squalene, therefore, depends upon biological tests in comparison with natural squalene.

1.013

but canned fish production is considerably below this capacity. The bulk of the canned fish pack consists of bonito packed in oil.

Table 1.--Peru's Commercial Fisheries Landings by Principal Species, 1951-52 & 1954

Species			1954	1952	1951 3/
English Name	Peruvian Name	Scientific Name	...(Million Lbs.)...		
Tuna, yellowfin	Atun	Neothunnus macropterus	6.3	9.6	14.3
Tuna, skipjack	Barrilete	Katsuwohus pelamis	8.9	10.1	2.9
Bonito	Bonito & Chauchilla	Sarda chilensis	115.1	117.3	112.5
Swordfish	Pez espada	Xaphias gladius	1.5	5.7	3.3
Pacific mackerel	Caballa	Pneumatophorus peruanas	7.8	7.3	2.5
Herring, shad	Machete	Ethmidium chilcae	21.4	19.5	28.3
Drum	Lorna, corrina, & robalo	Sciaena sp.	20.6	13.2	9.3
Sharks	Cazon & tollo	Musteles sp. & Scoliondon sp.	8.5	3.4	1.7
Anchovy (except bait)	Anchoveta	Engraulis ringens	77.7	35.1	15.0
Others 1/			2/ 21.9	27.4	3/ 23.8
Total			289.7	248.6	213.6

1/ Some of the more important species included are: white sea bass or ayanque (Cynoscion annalis), grunt or cabinza (Isacia conceptionis), sea trout or coco (Paralonchurus peruanas), mullet or lisa (Mugil cephalus), pejeblanco (Caulolatilus princeps), silverside or pejerrey (Austromenidia regia), pilchard or sardina (Sardinops sagax), and Spanish mackerel or sierra (Scomberomorus maculatus).

2/ Includes 500,000 pounds of shrimp.

3/ Based on data from the Direccion de Capitanias. Bureau of Fisheries and Wildlife estimates. landings at 232.2 million pounds.

Note: Based on reports of port captains to Peru's Bureau of Fisheries and Wildlife. The Bureau does not regard these data as complete. Includes landings by Peruvian-based boats regardless of whether or not they are Peruvian flag boats. Data for 1953 not available by species.

1.0142 ESBJERG: ITS MARKETING ORGANIZATION

Anonymous
World Fishing 5, 26-28 (February 1956)

Quality is the keynote at all stages of fish handling at Esbjerg, Denmark. The Danes rely on fish as a staple export product and nothing but the best will do for export.

It is impressive to see the care put into all aspects of fish handling and distribution in Esbjerg where a survey was recently made of the fish handling industry. Quality begins at sea, and on arrival at Esbjerg catches are subjected to a rigid quality control system. The control is exercised by inspectors appointed by the Danish Ministry of Fisheries and their powers are wide.

England is Esbjerg's biggest customer and the great majority of the fish exported to England is plaice. The unique thing about the Danish plaice is the grading system. In any one box of fish the plaice will be of the same quality and the same size.

Particularly noteworthy is the hygienic care taken by all concerned in handling of fish. The fishery control people keep a very close watch on the plant operations. They even look at the undersides of the filleting tables to see if slime has accumulated there and may levy fines for unhygienic conditions. Some of the larger plants have filleting machines, but most of the filleting is done by hand.

The Danes are also well advanced in the field of quick freezing. A big percentage of Esbjerg merchants have their own freezing plants and have developed markets for frozen fishery products both at home and abroad. There is now hardly a country in the world where Danish consumer and catering packs do not go. An interesting sidelight on the large American market that the Danes have developed is that all quick frozen dabs and plaice are specially called "flounder" for this market.

ABSTRACTER: Kathryn L. Osterhaug

1.81 SOME FACTORS AFFECTING FLUID LOSS IN SOUTHERN OYSTERS

Fingerman, Milton and Fairbanks, Laurence D. (Department of Zoology, Newcomb College, Tulane University, New Orleans, Louisiana)
Commercial Fisheries Review 18, 10, 11 (January 1956)

The factors responsible for fluid loss (bleeding) in the commercially-shucked Southern oyster (Crossostrea virginica) were determined. It was found that rupturing the underlying tissues when removing the oyster from the shell resulted in 50 percent loss of the original body weight. This weight loss could be reduced 25 percent if the underlying tissues were not injured. This was done by gently scraping the muscle attachment for removing the oyster from the shell.

Experiments were also designed to test the ability of the oyster to regulate the volume of the body fluids by opening or closing its shell. Wedges were, therefore, placed between the shells to prevent their complete closure. Oysters which had been wedged open lost approximately 30 percent of their body weight by secreting fluids from the body into the spaces between the shells. This loss of weight occurred in wedged oysters kept in sea water and in air. When oysters were able to control the opening of their shells they could regulate the volume of their body fluids without any loss of weight even when exposed to an environment of different salinities. Obviously oysters must be free to open and close their shells if they are to maintain a constant body weight and fluid content.

When the Southern oyster and the Japanese oyster were subjected to changes in salinity of their environment it was found that the Southern oyster was better adapted to overcome this type of stress condition.

ABSTRACTER: Elliott Pachtman

1.20 SARDINES - 1955 GAIN SUBSTANTIAL BUT NOT SPECTACULAR

Anonymous
Pacific Fisherman (Yearbook Number 1956) 139-145 (January 25, 1956)

The California sardine industry continued its comeback in 1955 with the best catch in 4 years, plus a strengthening market. Although the gain was not spectacular, it was consistent in sustaining the upward trend that has marked the fishery for the past few years.

Virtually all of the fish were taken in southern waters although the central California operators trucked a substantial proportion of the catch to their plants for processing.

Markets for California canned sardines were definitely better than a year before, and strengthened as the season advanced. This was believed to be due in large part to reduction in the competing supplies from South Africa and to less competition from Japanese sources.

Due to the scarcity of fish in both southern and northern California waters during the past few years, the Fish and Game Commission has granted no permits for unrestricted reduction of sardines, and the "straight reduction" plants are out of business.

In 1951 there were 29 sardine reduction plants in the Moss Landing, Monterey area, in 1955 there were but 11 plants still intact, 6 of these were in conjunction with canneries.

In the San Francisco area there were in 1951 some 33 sardine reduction plants. In 1955 only 11 of these would be in a position to operate on sardines should the fish come back and reduction of straight fish meal and oil be allowed.

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ABSTRACTER: Kathryn L. Osterhaug

3.26 RETAIL SHRIMP SALES INCREASE 84% IN MERCHANDISING EXPERIMENT

Anonymous
Southern Fisherman 16, 33 (February 1956)

Shrimp sales increased 84 percent in a dozen retail stores participating in a recent merchandising experiment conducted by the Fish and Wildlife Service. A modest increase in the variety of shrimp products available to the shopper and some "point-of-sale" advertising material brought better sales in most of the independent neighborhood food stores scattered in suburban areas of Greater New York, Chicago, Waterloo, Iowa, and Harrisburg, Pennsylvania.

The merchandising sales experiment comprised three bi-weekly periods during October-November 1955. In the first, the store carried usual shrimp supplies as a check on normal activity. In the second period more types of shrimp products and more package sizes were added to the display cabinets so that the public had a nearly doubled choice of shrimp varieties and package sizes. During this period sales increased by 60 percent on the average. In the third period, cards and streamers advertising shrimp were displayed. Another increase of about 24 percent over the first period sales occurred when the advertising material was introduced.

Sales audits in the stores were made by the A. C. Nielsen Company, under a contract with the Service using Saltonstall-Kennedy funds.

While this limited merchandising experiment does not solve all marketing problems of the shrimp industry, however, it definitely shows the possibility of enlarging shrimp markets (a) by offering to the prospective customer in a neighborhood food store a greater variety of shrimp products and package sizes and (b) by using "point-of-sale" advertising material.

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QUALITY OF DANISH FISH

CALIFORNIA SARDINE INDUSTRY

BLEEDING OF SOUTHERN OYSTERS

MERCHANDISING SHRIMP

1.20 (Cross Reference: 9.2)

Future pack sardines in tomato sauce, ovals, were being quoted at $6.75 per case before the season opened; and talls, natural, $4.75 per case, San Francisco.

As the year ended ovals in tomato sauce were quoted $7.25 to $7.00; and talls, natural $5.50 to $5.25, for domestic shipment.

3.26 (Cross Reference: 1.85)

The merchandising experiment is part of a shrimp industry study now in progress by the Fish and Wildlife Service. The study will examine the potential markets for shrimp products, efficiency in processing plants, primary marketing methods, work practices on shrimp fishing craft and vessel design.

1.0142 (Cross Reference: 2.3)

1.81 (Cross Reference: 2.3)

1.85 PACIFIC SHRIMP -- RICH RESOURCE OF MODERN MEXICO

Ferreira, Hector (Pesquera e Industrializadora de Guaymas)
Pacific Fisherman (Yearbook Number 1956) 169 - 173 (January 25, 1956)

Although shrimp have been used in Mexico for 5 or 10 centuries, only in the past few years have commercial quantities been produced.

Commercial canning of shrimp has been practiced in Mexico only 26 years. Now firms are located on the coast as far north as Guaymas. The more successful plants are located in lagoon areas where shrimp produced by the weir system are cheap and plentiful. The canning industry amply supplies domestic demand. Small quantities of canned shrimp were exported to the United States during World War II, but high production and transportation costs, export duties, and marketing problems made such attempts uneconomical.

Commercial developments in 1921 brought two purse seiners rigged for trawling in the bays. The operation was not successful due to insufficient catches and difficult and costly transportation.

In 1928 another attempt was made to take fresh shrimp from Mexico to the United States. Because of its large size, the Mexican shrimp was a new product with a new market. Sales averaged 6 to 8 cents per pound for the 16/20 and under 15 sizes.

Efforts were continued by an American from 1928 to 1932 with varying success. A Japanese enterprise using a refrigerated steam schooner was short lived because of lack of planning and distance from the market.

In 1934 the trawl fishing and freezer boat operation was undertaken by an American concern. Forced out by the Japanese in 1937, the American firm left knowledge and good will behind. Although the Japanese forced out all competition, they gave some benefits to the Mexican fishery. They extended the known fishing areas and explored the deeper water. However, their methods resulted in a desire for a domestically controlled industry. The past president of Mexico, local men, and an

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 ABSTRACTER: Lois Elgin

1.87 KEEP THEM ALIVE!

Anonymous
Fishing Gazette 73, 34, 56 (February 1956)

New England lobsters are being kept alive in Boise, Kansas City, Omaha, Chilicothe, Carson City, and other areas where the lobster doesn't ordinarily thrive.

Scientific engineering, precision planning, long range foresight and ingenuity were used in devising lobster pools. The lobsters are kept alive in a scientifically prepared solution. A firm in Portsmouth, New Hampshire, built the pools to exact specifications. When a wholesale dealer, a retail store owner, or a restaurant expresses an interest in the pools, a representative goes to the prospective customer. The representative discusses installation, notes the exact measurements and capacity and advises as to shape and other technical details.

The pools are not in the experimental stage as they have been operating successfully for the last 7 years.

The pools range in capacity from 500 to 10,000 pounds, and pools of even greater capacities can be built.

The solution is furnished; the amount varies according to the size of the pool. The lobster can be kept alive in these pools indefinitely.

It is stated that the pools save money usually lost through shrinkage and mortality. For example, a shipment of lobsters about 1,100 miles will average a weight loss from 3 percent to 8 percent.

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 ABSTRACTER: Lois Elgin

1.86 MARYLAND COMMERCIAL FISHING GEARS. III. THE CRAB GEARS

Cargo, David G.
Board of Natural Resources, State of Maryland, Department of Research and Education, Educational Series No. 36 (April 1954)

The history of Maryland's crab industry, which started about 80 years ago, is divided into two phases that are based on the stage of the crab, whether hard or soft. The hard crabs sold by the pound have an annual value to the crabber of about $950,000. for 21,000,000 pounds of crab. The catch of soft crab and peelers, sold by the count, number about 6,000,000 yearly for a value of approximately $400,000.

Some of the methods of capture used in the early days of the crab fishery are still employed today, however, the pot and patent dip net are recent inventions. The gears used in the industry are for the most part simple and inexpensive so that the boat employed represents the major investment. The various gears are designed to take advantage of the crab's behavior such as feeding, migrating, hiding, and its tenacity in holding onto bait.

The trotline, one of the most widely and oldest used methods, has a fairly high average yield of 2 to 4 barrels of crabs daily, depending, of course, upon the diligence and experience of the crabber. This gear is made from 1/8-inch cotton line which may be up to 1 mile long, although it is usually shorter. Cuts of bait, at 2- to 5-foot intervals, are attached to the line, generally by tying a slip knot in the line itself and clinching the bait in that fashion. While being operated the line is marked at each end by a buoy held in place by a weight. Chain is often used for weighting because it is heavy, compact, and can be stored with the line when hauling.

The cube shaped crab pot is limited by law in Maryland to 24 inches on a side. It is generally constructed of 1- to 1 1/2-inch chicken wire with heavy iron rod bracings. The design of this gear affords an easy entrance for the crabs through funnels to get to the suspended bait, but their escape is

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 ABSTRACTER: Harold C. Johnson

5.111 A POSSIBLE NEW VITAMIN A_1 ISOMER IN THE EYES OF CRUSTACEANS

Lambertsen, Georg and Braekkan, Olaf R. (Governmental Vitamin Laboratory, Norwegian Fisheries Research Institute, Bergen, Norway)
Nature 176, 553-554 (September 17, 1955)

In a recent communication, Kampa (1955) reports a new photosensitive pigment in the eyes of euphausiid crustaceans. This prompts the recording of some observations at this laboratory from a series of investigations of vitamin A components in marine animals.

During this investigation we recently obtained a fresh sample of the deep-sea prawn, Pandalus borealis. The vitamin A content of the eyes of this decapod was determined by our routine method, namely, chromatography of the unsaponifiable matter mainly according to Gridgeman et al. (1948). The ultraviolet absorption curve departed to the left from the expected vitamin A_1 curve, $E_{310m\mu}/E_{325m\mu} = 0.926$, $E_{335m\mu}/E_{325m\mu} = 0.823$, and $E_{350m\mu}/E_{325m\mu} = 0.424$. The vitamin A content was 150 I.U. per gram fresh tissue. No vitamin A_2 was present, $E_{693m\mu}/E_{618m\mu}$ in the Carr-Price reaction being 0.005.

The maleic acid anhydride reaction, according to Robeson and Baxter (1947), gave 70.6 percent recovery, showing mainly or only cis-configuration. The prawns had been exposed to daylight during sampling and removing of the eyes, thus complete bleaching may be assumed. These results, together with the biological potency of 50 percent compared to the chemical estimations as observed by Fisher et al. (1952) point to the occurrence of a new vitamin A_1 isomer in crustacean eyes, possibly the Δ-3, 5-di-cis-isomer, postulated by Hubbard and Wald (1952). Unfortunately, fresh samples of these crustaceans cannot be obtained until next winter, thus further investigations have to be postponed.

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MEXICAN SHRIMP INDUSTRY

CRAB GEAR

LOBSTER POOLS

A NEW VITAMIN A ISOMER

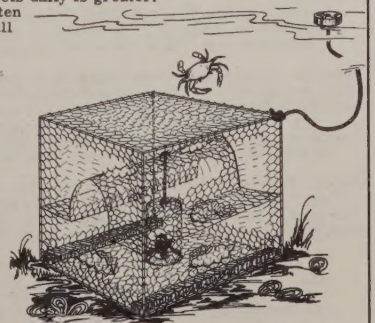
1.86 (Cross Reference: 2.14)

made difficult. Each Maryland potter must have a license which permits him to set a limit of 50 pots. This method of crabbing is gaining preference over the trotline because not only is it less demanding of the crabbers' time but the average yield of 3 to 6 barrels daily is greater.

The scrape is a dredge-like device which is most often dragged over shallows and grass covered areas by a small power boat. The catch is made up principally of peelers and soft crabs with a greatly varied yield of about 400 peeler per man daily. Generally, two scrapes are operated, that is, one from each side of the boat.

An estimated 97 percent of the total Maryland crab catch is taken by trotline, pot, and scrape. The lesser gears such as dip net, push net, and certain other varied gears contribute very little to the overall catch. The crab dredge and crab fyke are prohibited by law in Maryland except for certain waters where they have not proven very successful.

Crab Scrape. The frame of this sturdy device is made of iron while the bag is of cotton twine. It is hauled on the bottom and is used in the summer soft crab fishery, especially in the Tangier Sound area.



Crab Pot. Constructed of chicken wire, this cubical trap, 2' x 2' x 2', has four openings or funnels inward. There are two compartments, in the lower of which is a bait holding device. The upper one is a holding chamber.

5.111

1.85 (Cross Reference: 1.012)

American brokerage firm took overall aspects of the industry from fishing to freezing and formed the Mexican Pacific Shrimp industry.

The first Mexican enterprise to replace the Japanese set up an operation covering all phases of the business; a fleet of 15 properly equipped boats, land freezing plant, ice plant, shipyard for new boat construction and repair, ship chandlers, financing, and most important, adequate distributing channels in the United States. Better rail service and highways also aided the industry.

During the war years the industry prospered. After the war new investors established new operations. The northern fishing areas have gradually expanded so that fishing is continuous 10 months of the year. There have been important developments in southern areas also.

The ever expanding industry was intermittently pressed by financial, technical, social and economic problems. For example, the older producing grounds have been yielding smaller catches. As the industry was lacking in knowledge of the shrimp resources, the institution, "Instituto de Pesca del Pacifico", was established for research into the fishing methods and the various species of shrimp that support the industry. After a promising start, the institution has suspended work due to lack of funds.

To illustrate the success of the industry, production has grown from 2,500 pounds in 1941 to 29,000,000 pounds in 1954. International cooperation through the Shrimp Association of the Americas will help solve marketing problems and other problems common to all.

1.87 (Cross Reference: 2.6)

This weight loss, due to dehydration, is regained after placing the lobsters in the pool.

2.114 AUTOMATIC STEERING ON SMALL SHIPS

Stuland, Tor
Norwegian Fishing News 3, 6-10 (1956)

Automatic devices are being used on small ships at an ever increasing rate. At present the trend is toward automatic steering devices.

Equipment operated from batteries as well as from the ship's power supply has proved effective so that even small motor boats have been equipped with automatic steering gears.

A Norwegian firm is marketing several types of automatic pilots developed for small and medium-sized ships.

The operation of the automatic pilot is so simple that it is often used even on short runs. However, it is on the long runs that it is of greatest value, keeping the selected course for hours or even days with a minimum of deviation.

When the automatic pilot is on, no manual adjustments are required in order to select a course. As soon as the ship is on the desired heading, the automatic pilot is brought into operation by throwing a single switch into "automatic" position and the ship is kept on course. By throwing the same switch into "hand" position the ordinary wheel and steering gear are brought into operation again. The automatic pilot is self aligning and thus is always adjusted to the same heading as the ship.

Any small correction of the course is done with a course corrector control. For remote control, as in steering from the masthead or the stern of trawlers, additional transportable controls are available.

In the Robertson automatic pilot the controlling element is a magnetic compass. The compass card carries a small circuit that acts upon a high frequency oscillator located below the compass bowl in the compass unit. The oscillator works through an electronic valve in the electromagnetic controls of the steering gear.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

2.118 PIONER HANDED OVER TO MURMANSK CREW

Anonymous
World Fishing 5, 44-49, 64, 66 (February 1956)

On January 13, 1956, the first of twenty Diesel trawlers being built for Russian owners at a Lowestoft, England yard was officially handed over. The Pioner is an attractive vessel with a well flared bow, cruiser stern, and streamlined superstructure. Her principal particulars are as follows:

Length overall	189 feet 9 inches
Length b.p.	171 feet 9 inches
Breadth, moulded	32 feet 0 inches
Fish hold capacity	420 cu. m.
Meal hold capacity	50 cu. m.
Liver oil capacity	20 tons
Canned livers (cans)	15,000 (each 5 grams capacity)
Diesel and lubricating oil capacity	95 tons
Boiler capacity	40 tons
Freshwater capacity	53 tons (not including forepeak capacity)

See drawing, over.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

2.118 GERMAN-BUILT FACTORYSHIP TRAWLERS RAPIDLY NEARING COMPLETION

Anonymous
Commercial Fisheries Review 17, 64, 65 (December 1955)

In 1954 a Russian firm placed an order for 24 factory trawlers with a firm in West Germany. The first trawler was completed in the spring of 1955.

The handling and processing of the catch on board ship is as follows: From the working deck aft on which the net is emptied, the fish are conveyed via a chute on to the factory deck situated underneath. On this chute there are several places at which the fish are eviscerated. The offal passes to the fish meal factory, whereas the livers are conveyed to a sorting table and from there go into canning preserves or liver oil. The dressed fish pass via a heading machine to the filleting machine. The fillets are then mechanically skinned and weighed into fixed-weight blocks. The blocks are placed in collection trucks and deep frozen in freezing tunnels. After the freezing process, they are glazed and mechanically packed. Conveyor belts carry the packages to the refrigerated cargo holds where they are stored. However, it is also possible to freeze and store whole fish.

See illustration, over.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

6.00 RECENT DEVELOPMENTS IN THE FISH BYPRODUCTS INDUSTRY

Lovern, J. A. (Torry Research Station, Aberdeen, Scotland)
Journal of the Science of Food and Agriculture 6, 233-239 (May 1955)

The main fish byproducts industry deals with the production of protein feeding stuffs and oil from the processing of offal and from fish unsalable for human food. According to whether the raw material is rich or poor in fat, the industry has developed along somewhat different lines.

Two recent developmental trends are (a) the introduction of pneumatic (air-lift) driers having relatively low drying temperatures and very short drying times, with high capacity in relation to size of unit, and (b) the increasing interest in alternative products to conventional fish meal. These are peptized products in which the protein has been largely converted into water-soluble fragments by acid treatment, or by ensiling the fish with a fermentable carbohydrate (e.g. molasses) and a lactic-acid producing organism. The efficient processing of oily raw material is particularly handicapped by alternating gluts and scarcities of fish, and some methods of storage of raw material are being studied including preservation by addition of alkali, formaldehyde and sodium nitrite or by preservation of a half-processed commodity such as press-cake. The seasonal nature of certain fisheries and the migratory habits of the fish, e.g. herrings, have led to many proposals for floating oil and meal factories. The economics of this are far from simple, but development along these lines is in progress in certain areas. Processing of oily material usually involves the expression of about half the total water along with the oil. In some countries, e.g. the U.S.A., the aqueous fluid is concentrated and marketed as a special product, 'condensed fish solubles', but the present trend in Europe at least is to return the material in some form to the final meal.

(over)

 Author's summary

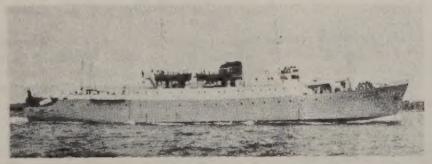
AUTOMATIC STEERING

FACTORY TRAWLERS FOR USSR

FACTORY-SHIP TRAWLER

DEVELOPMENTS IN FISH BYPRODUCTS

2.118



The M/V Dobrolubov, one of the 24 factoryship trawlers being built in Kiel, West Germany, for the U.S.S.R.

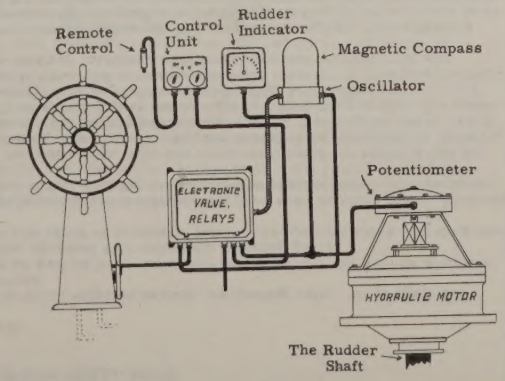
6.00

Certain otherwise highly efficient types of drier, e.g. the flame drier, have in the past been operated without any attempt to deodorize the large volumes of effluent vapor. A modern development is the designing and increasing use of water-scrubbing plant for driers of this type. However, the introduction of pneumatic (air-lift) driers, with enormously increased amounts of effluent air, has brought with it a new problem if deodorization is found to be as necessary as with other types of drier.

2.114

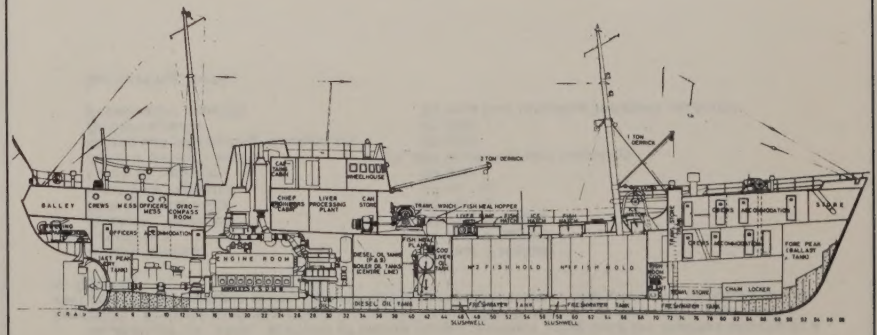
When the ship is on a selected course the current in the oscillator circuit and through the electric valve has a constant value. The "on course" current through the electronic valve energizes a balanced relay and keeps it in its "off" position. The balanced relay has two contact points, one for starboard and one for port rudder.

When the ship deviates from her proper course, the balanced relay connected to the electronic valve engages one of the two side contacts thus energizing the main relays of the steering engine which in turn moves the rudder to port or starboard and corrects the course.



Diagram, right, --Auto-Pilot in Connection with Hydraulic Steering Gear. In the hand-operated model an electric motor drives the wheel and serves as steering motor. Other models are used in connection with steam and electric steering gear.

2.118 (Cross Reference: 1.0145)


GALLEY
CREWS MESS
OFFICERS MESS
GYRO-COMPASS ROOM
CHIEF ENGINEER'S CABIN
LIVER PROCESSING PLANT
CAR STORE
WHEELHOUSE
3 TON DERRICK
1 TON DERRICK
TRAWL WINCH
FISH MEAL HOPPER
OFFICERS
NAVIGATION
ENGINE ROOM
STEERING GEAR
DIESEL OIL TANK (P & S)
BOILER (P & S) TANKS (CENTRE LINE)
No 2 FISH HOLD
No 1 FISH HOLD
FISH HOLD PLATFORM
FISH HOLD PLATFORM
FISH HOLD PLATFORM

3.19 IRRADIATED FOODS STILL DISTANT

Roy, W. R.; Tressler, Donald K.; and Doughty, Sterling B.
Quick Frozen Foods 18, 79-81 (March 1956)

The members of a panel speaking on the role of radiation in food preservation agreed that irradiated foods still have a long way to go before they will be competitive with other types of preserved foods. When they eventually reach store shelves they will supplement, rather than displace, competitive food products.

Dr. W. R. Roy said that the most promising applications are (1) combining radiation with heat treatment for enzyme control, (2) combining radiation with chemical treatment to reduce development of off-flavors and, (3) surface (or partial) sterilization to extend the shelf life of certain foods, particularly meat products.

Dr. Tressler said that packaging studies in connection with irradiated foods have just begun. Tentative results indicate that plastic sheetings are adequate for partially sterilized products, but completely sterilized products will require hermetically sealed cans.

Sterling B. Doughty said that it appears there are possible commercial applications of irradiation designed to kill insects, arrest sprouting, and provide a certain measure of "cold" pasteurization.

Ideally, a procedure for preserving foods should be one that: (1) effectively kills all microorganisms to produce a sterile product, (2) destroys or completely inhibits all enzyme systems, (3) effects no change in flavor or aroma, (4) does not decrease the nutritional value of food; i.e., no decrease in vitamin content, no impairment in protein, fat, or carbohydrate fractions, (5) does not bring about

(over)

 ABSTRACTER: Kathryn L. Osterhaug

3.26 FISH AND WILDLIFE SERVICE AIDS FISHING INDUSTRY IN PROMOTING FISHERY PRODUCTS IN OHIO

Seifert, Robert P.
Commercial Fisheries Review 18, 1-4 (February 1956)

A joint program by the fishing industry and the Fish and Wildlife Service to promote fishery products in a specific area was undertaken during the fall of 1954 in Columbus, Ohio.

The National Fisheries Institute concentrated its efforts on publicizing fish fillets and fish sticks through the use of radio and television commercials and newspaper advertisements. In addition, the Institute supplied Columbus newspaper food editors with fish recipes and pictures. Sparked by the Institute's efforts, the industry placed extra emphasis on promoting their own brands of fillets and fish sticks to complement the general promotion.

To this campaign, the Fish and Wildlife Service contributed the services of a home economist and a fishery marketing specialist who arranged and presented a series of fish cookery demonstrations in the Columbus area. The demonstrations were given for cooks and managers of parochial and public school cafeterias, Air Force and Naval Station mess halls, public and private institutions, Ohio State University food-service personnel, television food shows, and for a food class at the local electric company.

In addition to presenting the demonstrations, the Fish and Wildlife Service personnel interviewed the food editors of three Columbus newspapers and a local feature writer and radio food editor. All of these people were furnished with recipe pamphlets, photographs, and other fishery education material published by the Service.

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 ABSTRACTER: Kathryn L. Osterhaug

3.26 THE DEVELOPMENT OF A SOLID-ABSORPTION REFRIGERATING MACHINE FOR USE ON TRAINS

Andrews, H. I.
Modern Refrigeration 58, 330-336 (September 1955)

British Railways have thus far employed water ice or solid carbon dioxide as refrigerants but they have been found to be expensive sources of cooling. A further disadvantage has been the danger that if the consignment is delayed in transit, the supply of refrigerant may become exhausted and the goods damaged.

To avoid these difficulties, the British Railways undertook this research in order to devise a cheap, yet practical refrigerating machine suitable for use on trains.

Since a steam supply is generally available for train heating whether steam or diesel or electric powered, and since the normal demands for steam heating falls off as the ambient temperature increases, this would represent the most suitable source of energy for refrigeration.

Some of the principal design requirements for such a refrigerating machine would be: (1) it should be operated by steam from the train heating supply at 50 pounds/square inch, (2) necessary cooling should be obtained from outside air. An outside sustained temperature of 70° F. with occasional short periods up to 90° F. was assumed, (3) it should be able to store a reserve of energy, be safe and require a minimum of maintenance and, (4) it should be capable of holding temperatures of about 15° F.

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 ABSTRACTER: Max Patashnik

6.3 THE EFFECT OF FEEDING DIFFERENT SEAWEED MEALS ON THE MINERAL AND NITROGEN METABOLISM OF LAYING HENS

Hand, C. J. E. and Tyler, C.
Journal of the Science of Food and Agriculture 6, 743 (December 1955)

Three different seaweed meals, Laminaria cloustoni, Ascophyllum nodosum and Laminaria saccharina, were fed to poultry in three different experiments. In each experiment levels of 10 percent and 20 percent in a basal ration were compared with the basal ration itself.

When the seaweed was low in energy the birds showed loss in weight or lowered egg production or both. The high chloride intake when the ration contained seaweed resulted in a greatly increased water intake and a heavy excretion of both chloride and water, but this did not appear to affect the general health of the birds. Changes observed in calcium, phosphorus and nitrogen retentions and balances could be explained on the basis of changes in egg production. The seaweeds had no effect on the chemical composition of egg content and shell, nor on porosity and shell thickness. On the basis of these criteria seaweed meals therefore had no beneficial effects and at the higher level of 20 percent were detrimental in some respects.

In a further, long-term feeding experiment Laminaria cloustoni (stipe), Laminaria cloustoni (frond) and Ascophyllum nodosum were fed at levels of 10 percent and 15 percent, each level being given for 100 days. The results, as far as they were comparable, supported the more detailed balance experiments.

 Author's summary

RADIATION PRESERVATION

SELLING FISHERY PRODUCTS

REFRIGERATION ON TRAINS

SEAWEED FOR LAYING HENS

3.26

In reviewing the overall promotion campaign and the contributions made by the industry and by the Fish and Wildlife Service, it was evident that the efforts of each organization complemented the other to produce a well-rounded balanced promotional program. The industry, including the National Fisheries Institute, relied largely on paid advertising, whereas the Fish and Wildlife Service was particularly suited for its work with schools and institutions, utility companies, the Armed Forces and the TV stations of the area.

The sales managers of frozen food distrubutors who worked closely with the promotional campaign experienced sharp increases in their fish-stick and fish fillet sales. The frozen food manager of one large distributor to retail stores was surprised to note the degree to which the movement of all types of fishery products seemed to be accelerated as the campaign gathered momentum.

6.3

3.19

undesirable changes in color, physical texture or appearance, or in any chemical characteristic of the food, (6) so preserves the food that, adequately packaged, it will keep indefinitely (2 years) without any undesirable changes at ambient temperatures, and (7) is economically competitive with existing methods--canning or freezing.

3.26

After considering several alternatives it was decided that an absorption machine with a solid absorbent was the most feasible. Of the various material combinations available, the ammonia-calcium chloride and the monomethylamine-lithium chloride systems appeared to be most suitable.

The machine envisaged was to be composed of a generator-absorber, an air cooled condenser, and evaporator, and a radiator for water cooling. The design and construction of a generator-absorber employing a solid absorbent represented a novel problem. Several trial models had to be built before a final design could be evolved. Appropriate design constants have been tabulated for the two systems under investigation.

3.26 GROWTH OF A YOUNG GIANT -- THE HOME ECONOMIST'S ROLE IN THE FROZEN MEAT INDUSTRY

Chambers, Ruth
Canner and Freezer 122, 26, 33 (February 20, 1956)

The fast growing frozen food business needs a woman's guidance as she can anticipate and interpret a woman buyer's wishes.

The home economist is a helpful member of the staff; she can assist in planning future frozen products, packaging and sales promotion. Her working knowledge of the homemaker's food preparation problems is valuable in determining size, shape, and number of portions per package. Other considerations in devising new products are the popularity of various foods and time saving methods.

In working with uncooked meats, the home economist knows the most satisfactory cooking method for the various cuts of meat. Her knowledge will save much experimentation. If the food is to be precooked before freezing, the woman's touch is even more important. Her knowledge of herbs, spices, and seasonings will be very valuable.

Arrangements of the taste panel and the preparation of the foods for testing should be the responsibility of the home economist. Her preliminary evaluations of the panel results will help indicate how well the product is developing. Other women from the office or plant in the testing groups can anticipate consumer reactions to appearance, flavor, and other qualities. An informal conversational period following the sampling and scoring may produce ideas never thought of in the original planning.

(over)

 ABSTRACTER: Lois Elgin

4.5 OXIDATIVE DETERIORATION IN FISH AND FISHERY PRODUCTS NO. 1

Brown, W., Tappel, A. J. (Food Technology Department, University of California, Davis) and Stansby, M. E. (Fishery Technological Laboratory, Fish and Wildlife Service, Seattle, Washington)
Commercial Fisheries Review 18, 10-13 (February 1956)

Oxidation reactions are among the most destructive of those causing changes in fish oils and pigments. These changes involve deterioration of flavor and odor, the development of off-colors, and a lowering of nutritive value. The chemical composition of the oils may be so altered that their value for certain industrial applications is lowered.

Although considerable research has been carried out on the oxidation of oils and pigments in animal and vegetable products, similar work on marine products has been very limited. There is need for basic information regarding the mechanism of these reactions and for means of controlling them.

Fish and Wildlife Service personnel stationed in the Food Technology Department of the University of California are making a thorough study of this problem.

General approach to the problem. --Two phases of the program are now underway. The first is a study of the mechanism of oxidation of fish oils while still present in the flesh of fish. This phase is basic to applications, whether they involve changes in oil in the stored fish, in fish meals, or in the oil itself. Other work is being done concurrently in collaboration with the Poultry Husbandry Department on oxidation of oil in fish meal. Work on oxidation of pigment and on oxidation of extracted oil will get underway later when a new fishery technology laboratory is completed at Berkeley.

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 ABSTRACTER: Kathryn L. Osterhaug

4.11 INDICATORS FOR THE PAPER CHROMATOGRAPHY OF LIPIDS

Mangold, H. K.; Lamp, B. G.; and Schlenk, H.
Journal of the American Chemical Society 77, 6070-6072 (November 20, 1955)

The inclusion reaction has received considerable attention in recent years. The complexing reaction can be carried out in minute amounts such as are used in practical paper chromatography. Alpha-dextrin has been used successfully and proved a preferable indicator for chromatograms of fatty alcohols, acids, methyl or ethyl esters, and monoglycerides. The filter paper is sprayed with alpha-dextrin and is subsequently exposed to iodine vapors. Free alpha-dextrin reacts with iodine to form a deeply colored inclusion complex very similar to that resulting from starch with iodine. The area covered with the separated compound (e.g., fatty acid, etc.) remains white. Diglycerides and triglycerides do not respond to this indicator method, since they do not react readily with alpha-dextrin. The di- and triglycerides can be detected by splitting them into their components after chromatographic separations. The necessary hydrolysis is carried out in situ enzymatically by means of commercial pancreatin. Thus, it is possible to make visible the separated di- and triglycerides on the paper.

Iodine vapors have not been used before to detect higher fatty acids. In lipids, it was found specific for spotting unsaturated components. For example, oleic acid and its derivatives appear as dark brown spots on chromatograms when exposed to iodine vapors. Lead tetraacetate was found a more specific reagent which is applicable to the chromatography of monoglycerides. The reagent hydrolyses in air to form brown lead dioxide; with alphamonoglycerides it undergoes the normal glycol splitting reaction and yields colorless lead compounds. Consequently, monoglycerides appear as white spots on a brown background in chromatograms sprayed with lead tetraacetate solution. For the detection of di- and triglycerides it can be used after splitting them by the above mentioned enzymatic hydrolysis.

(over)

 ABSTRACTER: Edward H. Gruger

6.3 THROUGH-CIRCULATION DRYING OF SEAWEED. V. ASCOPHYLLUM NODOSUM; FUCUS SERRATUS; FUCUS VESICULOSUS

Mitchell, T. J. and Potts, C. S.
Journal of the Science of Food and Agriculture 6, 402 (July 1955)

The drying characteristics of freshly harvested Ascophyllum nodosum, Fucus vesiculosus and F. serratus have been investigated in a through-circulation dryer. All tests were carried out with minced seaweed. Variables studied were bed depth (0.5 to 6 inches approximately), air temperature (100 to 220° F.), air wet-bulb depression (30 to 115° F.), air mass velocity (5 to 11 lb./sq. ft. min.), and static pressure drops of air through beds of wet and dry weed. Bed-depth experiments have given equations relating drying times, constant drying rates, and outputs to loading. The output versus loading curve shows a well-defined optimum value for each species of seaweed. Empirical equations have been derived, relating drying times (between definite water content limits) and initial constant drying rates to air mass flow. It has been shown that the drying rates, at average water contents of 3.0 to 0.2, 2.7 to 0.2, and 3.5 to 0.15 lb./lb. of bone-dry solids (for A. nodosum, F. vesiculosus, and F. serratus respectively), are directly proportional and the drying times inversely proportional to the wet-bulb depression of the air. A study of the water content of various layers in a seaweed bed has been made. A typical drying rate versus water content curve is shown in figure 1, over, and a mechanism of drying of deep beds has been postulated. A section is included dealing with the prediction of approximate drying times and rates.

See figure 1, over.

(over)

 Author's summary

ROLE OF HOME ECONOMIST

FATTY ACID CHROMATOGRAPHY

HEMATIN AND RANCIDITY

DRYING OF SEAWEED

4.11

A table is given showing R_f values for different solvent systems as applied to the ascending technique with silcone impregnated paper, i.e., reversed phase chromatography.

Whatman No. 1 paper was modified according to procedures reported in the literature (T. H. Kritchevsky and A. Tiselius, Science, 114, 299 (1951)). They found impregnation with silicone to be the most versatile preparation for their purpose. That is, the silicone is not washed out by the developing solvents from the impregnated paper and the same paper can be used for reversed phase chromatography in the second dimension. The quality of the paper remained unchanged over a six-week storage period.

It was found that R_f values increased with shorter chain lengths and higher unsaturation. An R_f value gain of one double bond is approximately equal to that caused by a loss of one ethylene group, thus it is impossible to separate palmitic and oleic acids. However, by combining indicators it is possible to detect one (oleic acid) while the other (palmitic acid) remains superimposed and undetected.

Besides chromatographing lipids groupwise, several other combinations have been separated. For example, mono-, di-, and triglycerides having identical acid components, were separated in chloroform-methanol; unsaturated monoglycerides mixed with the corresponding free acids were chromatographed for the monoglycerides in tetrahydrofuran-water; and cetyl alcohol, palmitic acid, and its methyl ester were separated in 85 percent acetic acid.

According to the authors, "It is impossible at the present time to chromatograph on paper a multicomponent mixture of closely related glycerides as they occur in natural mixtures, and it is still necessary to reduce the number of components. The procedures described already have proved their value where separation has been achieved without being intended."

Given in the paper is a description of experimental method and indicator methods.

6.3

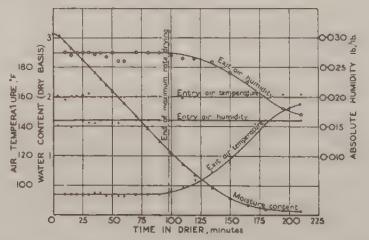

Figure 1.-- Drying of seaweed; Ascophyllum nodosum
Ld=2.26 lb./sq. ft.

3.26

A woman's assistance is very important in planning packaging for self-service shopping. The illustration of the product, if there is to be one, needs to be attractive to both men and women. The garnishes and accompanying foods should be simple enough to be self explanatory and easily duplicated in the home. Cooking and reheating instructions, clearly written and in women's language, are a sales feature as many women read them at point of purchase. Suggested recipes should be simple without many ingredients, yet sound interesting enough for the homemaker to want to try it. If she is pleased with this recipe, she will be encouraged to buy the same brand again.

The home economist should also have a part in planning an advertising campaign, helping particularly with the illustrations. Easily prepared garnishes and accompaniments are a big sales tool here too.

The home economist can also train sales representatives for work in store demonstrations, as she is very familiar with the product and its sales points.

Through the dream stages to the reality of the product in the frozen food cases, the home economist can be of real assistance.

4.5

Hematin compounds in fish.--Work on the first phase was begun by the analysis of various species of fish for their hematin content. These compounds are substances that have been shown to be powerful biocatalysts for oil oxidation in other foods. Hematin compounds were found to be present in all of the nine species examined, the content varying from 5.4×10^{-5} M in pilchard down to 0.1×10^{-5}M in cod.

Effect of hematin compounds on fish-oil oxidation.--The determination of the effect of hematin compounds on fish-oil oxidation was carried out by measuring the amount of oxygen uptake of a salt in an unsaturated fatty acid, ammonium linoleate, when subjected to aeriation in a Warburg respirometer. The reaction was carried out at 20° C. at a pH of 9.0 and extracts of fish were added to the ammonium linoleate substrate to determine their effect on the oxidation rate. The fact that the catalysis was due primarily to hematin compounds and not to some other biocatalysts in the fish was confirmed by repeating the experiments in the presence of cyanide, in which case no catalyic effect resulted. Cyanide inhibits hematin catalysis of unsaturated fatty acids.

In a second series of experiments, cubes of fish flesh and extracted fish oil from various species were measured for rate of oxygen uptake in a Warburg apparatus.

The results of all experiments have indicated correlation between the hematin compound content of the various species of fish and the catalytic effect of fish extracts on the linoleate oxidation. The rate of oxidation of the fish flesh also was correlated with the content of hematin compounds.

6.190 NUTRITIVE VALUE OF HERRING MEALS. 3. THE EFFECTS OF HEAT TREATMENT AND STORAGE TEMPERATURE AS RELATED TO OIL CONTENT

Biely, J.; March, B. E.; and Tarr, H. L. A. (University of British Columbia and Pacific Fisheries Experimental Station, Vancouver, B. C.)
Poultry Science 34, 1274-1279 (November 1955)

In reviewing the literature, the authors point out several investigations which have indicated that fish oils in poultry feed may cause decreased growth. These investigations have concluded that the adverse effect may be due to (1) the presence of heat-polymerized oil, or (2) the presence of oxidized oil which causes a loss of vitamin A, biotin, or other vitamins. This investigation is concerned with the effect of temperature and storage on the nutritive value of herring meal.

Three series of chick feeding tests were carried out employing a basal ration as follows: ground yellow corn 78.0, herring meal 18.0, bone meal 0.5, limestone 1.0, iodized salt 0.5, dehydrated cereal grass 1.0 (this component was present in series 1 only), choline chloride (25 percent) 0.4, manganese sulfate 0.025 plus the following as grams per 100 pounds: nicotinic acid 0.8, calcium pantothenate 0.5, riboflavin 0.2, fish oil (35,000A) 8.0, and dry vitamin D 10,000 units per 100 pounds. The rations were fed to day-old New Hampshire cockerel chicks kept in heated battery brooders and given free access to feed and water.

The first series of tests was designed to show the effect of the oil content of herring meal on chick growth and also to show the effect of heating of low and high oil content meal on growth. Special low temperature dried herring meal was made by drying herring press cake at 37° to 43° C. in an air current. A portion of this meal was extracted to remove oil with hexane "at a low temperature" and the excess solvent removed in vacuo. Ten-pound portions of both the extracted and unextracted meals

(over)

ABSTRACTER: Maurice E. Stansby

6.3 THE EFFECT OF TEMPERATURE AND ACIDITY ON THE DRY STORAGE OF SODIUM CARRAGEENATE

Goring, D. A. I.
Canadian Journal of Technology 34, 39-41 (January 1956)

Carrageenin is the hydrocolloid extractable with water from the red seaweed, Irish moss. In recent work there was evidence that the dried extract, on storage, degraded and gave solutions of decreased viscosity (1, 4). Since viscosity is an important practical and fundamental property of the polysaccharide, further experiments were done to find the best conditions for storage.

Extractions were made at 60° C. on the residue of an extraction at 30° C. This method would be expected to yield mostly the gelling component (2). Solutions of the extract were dialyzed for 24 hours with internal stirring against 0.02 M sodium acetate to exchange all the cations for sodium. The acetate was removed by dialysis against distilled water. The hydrocolloid was then obtained as a white, spongy solid by freeze-drying. The water contents of the freeze-dried samples were between 5 and 10 percent. During the final stage of dialysis the "acidity" of the product could be controlled. Prolonged dialysis caused a marked lowering of pH owing to the removal of sodium ions and the formation of carrageenic acid. Dialysis against a low concentration of NaOH (e.g., 100 mgm./liter) resulted in a solution of pH 8-10. The pH of 0.3 percent solution in distilled water was taken as an empirical measure of the acidity of a sample.

The degradation was followed by the change in viscosity of freshly prepared solutions in an acetate buffer (pH = 5.5; I = 0.05). The specific viscosity, η_{sp}, was measured in modified Ubbelohde viscometers as previously described (1). The intrinsic viscosity, (η), was determined from $(\eta) = (\eta_{sp}/C)\ c \to 0$ where c is the concentration of the solute. The value of $(\eta_{sp}/C)\ c = 0.1$ percent was also recorded as a practical estimate of the viscosity at a working concentration of 0.1 percent.

Samples were stored in screw-cap bottles at room temperature (ca. 25° C.), 4° C, and -13° C.

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6.190 NUTRITIVE VALUE OF HERRING MEALS. 3. THE EFFECTS OF HEAT TREATMENT AND STORAGE TEMPERATURE AS RELATED TO OIL CONTENT CARD 2 (SEE CARD 1 FOR ABSTRACT)

Biely, J.; March, B. E.; and Tarr, H. L. A. (University of British Columbia and Pacific Fisheries Experimental Station, Vancouver, B. C.)
Poultry Science 34, 1274-1279 (November 1955)

Table 1.--Average weights of chicks fed unheated and heated, fat-extracted or unextracted herring meals as protein supplement in Experiment 1

Ration No.	Treatment of meal	Weights in grams at 10 days (16 chicks per lot)		
		Lot A	Lot B	Av.
1	Unextracted, unheated	86	89	88
2	Unextracted, heated 60 min.	86	90	88
3	Unextracted, heated 120 min.	69	73	71
4	Unextracted, heated 180 min.	54	57	56
5	Extracted, unheated	89	90	90
6	Extracted, heated 60 min.	88	94	91
7	Extracted, heated 120 min.	90	90	90
8	Extracted, heated 180 min.	56	57	54
9	No. 5, fresh herring oil added	94	87	90
10	No. 6, fresh herring oil added	91	84	88
11	No. 7, fresh herring oil added	85	87	86
12	No. 8, fresh herring oil added	57	58	58

(over)

ABSTRACTER: Maurice E. Stansby

7.73 BONE DETECTION IN FISH BY X-RAY EXAMINATION

Frascatore, Anthony J., Jr. and Holston, J. A. (Fishery Technological Laboratory, East Boston, Massachusetts)
Commercial Fisheries Review 17, 1-11 (November 1955)

Introduction.--This preliminary scale investigation was undertaken to determine if x-rays could be used to detect bones and voids in frozen fish fillets and blocks, with a view to developing a routine quality-control measure on a commercial scale.

Preparation of samples.--Nine samples were prepared as follows: (1) frozen fillet blocks about 9 x 12 x 2 inches were band saw cut in a staircase manner to give 1/8 x 1/2 inch steps. Bones of varying length and about 1/2 millimeter in diameter were inserted in each step, (2) haddock blocks about 2 x 3 x 1/8 inches were built up in blocks with bones inserted between them, (3) haddock slabs were prepared by inserting sea smelt belly flaps about 1/2 x 1 inch between slabs prepared as in (2), (4) haddock portions were prepared by splitting a 5-pound eviscerated fish and retaining the bones, (5) smelt portions (sea smelt) were split lengthwise giving 160-gram portions ranging from 3/8 to 1 1/4 inches thick, (6) ocean perch split lengthwise gave 3 portions placed with skin down, (7) whiting butterfly portions of about 130 grams and 1/2 inch thick were prepared by splitting the fish, (8) frozen fillet blocks, haddock bones were placed between two 1-x 9- x 12-inch pollock slabs, and (9) frozen fillet block, holes were bored into two frozen pollock blocks about 2 x 4 x 6 inches and the slabs were reunited.

Examination of samples.--Radiograms were made of each sample using a portable medical diagnostic X-ray machine (85kv. and 25 ma.) operating at 60 kv. and 25 ma. at 30 inches for five seconds on the blocks and 3 seconds on the portions. Fluoroscopic examinations were made under similar operating conditions. The radiographs clearly revealed all bones and voids down to 1/16 of an inch in all but one of the blocks, slabs, and portions up to the maximum thickness of 1 13/16 inches. The fluoroscope gave poor definition with the smaller voids and many of the smaller bones remained invisible.

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ABSTRACTER: Claude Thurston

NUTRITIVE VALUE HERRING MEAL (Card 1)

NUTRITIVE VALUE HERRING MEAL (Card 2)

STORAGE OF SODIUM CARRAGEENATE

X-RAY BONE DETECTION

6.190 (Cross References: 6.14, 6.139, 6.194, 6.134, 1.2)

Table 2.--Average weights of chicks fed extracted and unextracted herring meals in Experiment 2

Supplement to basal ration	Weights in grams of chicks at 4 wks. (20 chicks per lot) Without vitamin supplement	With vitamin supplement
Control	207	256
Extracted herring meal	219	258
Fresh herring oil	168	261
Herring oil heated 30 hours	182	242
Herring oil heated 105 hours	185	272
Fresh Herring oil*	185	- -
Herring oil heated 30 hours*	162	- -

* Herring oil mixed with herring meal and let stand at 21° C. overnight.

Table 3.--Average weights of chicks* fed various extracted and unextracted herring meals in Exp. 3

Test 1 (unstored meal) Description of herring meal supplement	Weights in grams of chicks † at 4 wks. Unextracted	Extracted
Low temperature	257 (20)	258 (20)
Normal commercial	163 (15)	178 (12)
Overheated commercial	193 (10)	167 (11)

Test 2 Average weights in grams at 25 days	Meals stored at 21° C.	Meals stored at 37° C.	Test 3 (meals stored at -25° C.) Average weights in grams at 5 wks.
Unextracted low temperature	327	322	470
Unextracted normal commercial	335	302	476
Unextracted overheated commercial	307	---	517
Extracted low temperature	281	338	456
Extracted normal commercial	339	323	508
Extracted overheated commercial	316	---	518

*Test 1: 20 White Leghorn pullet chicks per lot. Test 2: 25 White Leghorn cockerel chicks per lot.
Test 3: 22 New Hampshire cockerel chicks per lot.
†Figures in parentheses represent the number of survivors at 4 weeks.

6.190 (Cross References: 6.14, 6.139, 6.194, 6.134, 1.2)

were heated for periods of 60, 120, and 180 minutes in a rotating stainless steel drum at 149° C. The fat content of the unextracted meals ranged from 7.3 to 7.55 percent and of the extracted meals from 0.15 to 0.28 percent. These meals were used in the diets in the first series and the average weights of the chicks at ten days of two lots of 16 chicks each were determined on each of the diets. In the case of the rations containing extracted meals, replicate diets were also run to which fresh herring oil was added. (For data see table 1, card 2). With the unheated meals and those heated 60 minutes there was no difference in growth whether the meal had been extracted or not. With 120-minute heated unextracted meal, the growth was considerably retarded. With the 180-minute heated meals (both extracted and unextracted) the growth was greatly retarded. Addition of fresh herring oil to extracted meals had no effect on growth.

A second series was run which showed that the retarded growth occurring with the heated meals was due to destruction of vitamins. Addition of a vitamin supplement that included folic acid, thiamine, pyridoxine, inositol, α-tocopherol, para-amino-benzoic acid, biotin, and vitamin B_{12} completely prevented this decreased growth. The addition of herring oils oxidized to different extents did not show differing growth rate losses. In series 2 the chicks' growth was recorded after 4 weeks.

In series 3 the effect of storage of herring meal (hexane extracted and unextracted) at different temperatures was determined. Three herring meals were used, all prepared from the same press cake. Meal 1 was low temperature dried as in series 1. Meal 2 was a typical light-colored meal prepared by a commercial direct-flame dryer. Meal 3 was commercially dried at a much higher temperature than usual. The weights of chicks fed the basal diet containing these meals stored for 1 year at 21° C., 37° C., and -25° C. were recorded after 4 to 5 weeks (see data table 2 on card 2). Storage of the meal did not result in any loss of quality nor was there any difference in quality between the stored extracted and unextracted meals.

See card 2 for tables.

7.73 (Cross Reference: 3.237)

Conclusions.--While the radiographs were entirely satisfactory for detecting bones and voids in the commercial species of fish used, it is unlikely that they will find practical application with the fillet, or frozen-block industries as a routine quality-control measure. Fluoroscopy could be more readily applied using more versatile instruments and procedures.

Illustrative material.--One or more charts and radiographs are shown for each of the nine samples investigated.

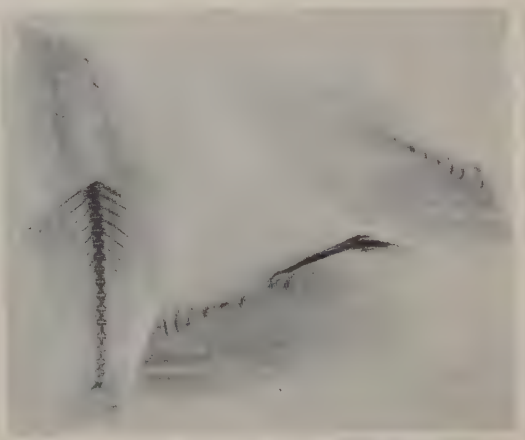

Figure 6b.--Radiograph clearly reveals the bones in the split ocean perch portions.

6.3

Three samples were studied in detail. Samples 1, 2-A, and 2-B had acidities of 5.0, 6.9, and 9.5 respectively. Samples 2-A and 2-B were part of the same extraction in which the acidity was controlled by addition of NaOH to the distilled water for dialysis. With Sample 1, extracted from another batch of seaweed, the pH decreased on prolonged dialysis to give an acidity of 5.0. Variation of (η) and (η sp/C) c = 0.1% with days of storage at various temperatures is shown. An empirical measure of the rate of degradation was the ratio of the initial value of (η sp/C) c = 0.1% to the value after 60 days' storage. Some further measurements were attempted on samples which were dialyzed to a pH of 3. Marked degradation occurred during dialysis leading, in some cases, to a 40-fold decrease in viscosity. On storage at room temperature this material was transformed into a hard black solid.

The data show than an increase in the temperature of storage of a sample accelerates the rate of degradation. This is supported by the known tendency of carrageenin in solution to degrade on heating. However, in sample 2-B, the polysaccharide is essentially stable at lower temperatures and there is little difference in the small change in viscosity at 4° C. and -13° C.

The viscosity on storage is also sensitive to the acidity of the sample. Extracts giving solutions of low pH are more unstable. This is further illustrated by the charring of samples with acidity of 3 when stored at room temperature. These results must arise from a marked instability of carrageenic acid. Removal of the sodium ion to give a partially acidic polysaccharide would then produce a tendency for degradation. However if the solid extract is prepared from a solution of pH 9-10, it may be stored at temperatures below 4° C. for long periods without appreciable change in its viscosity.

6.193 AN INORGANIC CHICK GROWTH RESPONSE

Dannenburg, W. N.; Reid, B. L.; Rozacky, E. E.; and Couch, J. R. (Texas A. & M. College System, College Station, Texas)
Poultry Science 34, 1023-1026 (September 1955)

Objective.--As a part of a study concerned with the unidentified growth factor present in distillers dried solubles, the authors decided to determine the effect of the ash from distillers dried solubles on the growth of chicks.

Experimental.--The straight run New Hampshire chicks used in this study came from hens that had been housed on wire throughout their lives and fed a ration consisting of 61 percent ground yellow corn, 35 percent soybean oil meal, 1.5 percent oystershell, 2 percent bone meal, and 0.5 percent salt. This ration was fortified with 2 milligrams of riboflavin, 5 milligrams of calcium pantothenate, 12.5 milligrams of niacin, 2 grams of choline chloride, 500 I.C.U. of vitamin D_3, 4,000 I.U. of vitamin A, 50 milligrams of $MnSO_4$, and 50 milligrams of vitamin B_{12} per pound of feed.

The chicks were housed in electrically heated batteries on raised wire floors and supplied with feed and water ad libitum. Their basal ration consisted of cerelose 64.5 percent, isolated soybean protein that had been washed 3 times with 70 percent isopropyl alcohol for 6 hours at 60° C. 25 percent, soybean oil 30 percent, and adequate vitamin and mineral mixtures.

One-third of the basal ration was fed as a control ration. One-third was supplemented with distillers dried solubles at a level of 3 percent of the ration at the expense of the cerelose and soybean protein. The other third was supplemented with distillers dried solubles ash prepared by burning distillers dried solubles over an open flame and then in a muffle furnace at 700° C. to a

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 ABSTRACTER: Martin Heerdt

6.3 SEAWEEDS AND THEIR CONSTITUENTS IN FOODS FOR MAN AND ANIMAL

Black, W. A. P. (Institute of Seaweed Research, Inveresk, Midlothian, Scotland)
Chemistry and Industry No. 51, 1640-1645 (December 17, 1955)

Seaweed for feeding animals.--In France during World War I, seaweed used as a supplementary feed for poultry, pigs, and horses reportedly was accepted, digested, and assimilated. However, the seaweed appeared to pass through the animals undigested until after the sixth day. Lunde's (1940) feeding trials with rats, pigs, horses, and poultry showed that an addition of 5 to 10 percent seaweed to the ration was often very beneficial. Ringen's (1939) experience with pigs and sheep showed an exceedingly low nutritive value for pigs but somewhat better utilization of seaweed by ruminants. Sheehy and coworkers (1942) who measured the digestibility of seaweed with pigs, showed that Laminaria meal had a feeding value intermediate between hay and oats or about 2 1/2 times the value of potatoes, enhanced the nutritive value of the original ration, and had a favorable action on the alimentary canal.

In experiments in Canada (1952), seaweed meal fed at the rate of 2.5 and 10.0 percent of the ration had little effect on the performance of laying hens from the standpoint of mortality, egg production, eggshell strength, hatchability, and body weights. No beneficial effects were observed. Chickens that received a ration containing seaweed meal (Ascophyllum nodosum) substituted for ground oats at levels of 2.5, 5, 10, and 20 percent showed a significantly lower final body weight only at the 20 percent level. Up to the 10 percent level seaweed meal could be tolerated provided the protein content of the ration was kept at a satisfactory level.

Romijn and Lokhorst (1953) found that after 6 months the body weight of hens fed 5 and 10 percent seaweed meal was about 6 percent lower than the weight of control hens, whereas the weight of hens fed 1 percent seaweed was 3 percent higher than that of hens on the control ration. Cameron (1954)

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 ABSTRACTER: Martin Heerdt

6.54 FLOUR FROM MAASBANKER

Anonymous
Fisheries Newsletter (Australia) 15, 19 (January 1956)

The South African fishing industry has developed a process for producing fish flour for human consumption from maasbanker (our jack mackerel) says Food Industries of South Africa. The process can be readily adapted for large-scale production, and soon the first workable quantities of fish flour will be produced by a pilot plant in the Dido Valley factory of Marine Oil Refiners of Africa Ltd.

In South Africa, white fish is not caught in sufficient quantities and what is caught is both too costly for reduction to meal and too much in demand in its fresh state. The obvious fish for processing are the prolific pilchards and massbanker which in Cape waters alone are harvested at the rate of 250,000 tons a year. Most of this catch is reduced to fish meal, so the reduction of part of it to a more valuable fish flour would be highly desirable for the industry.

These fish are, however, very oily and the meal produced from them has a distinctive and enduring taste, smell, and color. The processes tried successfully on whitefish failed when applied to these oily fish, so two years ago the search for new processes started.

Backed by the Department of Nutrition and by the fishing industry, the Fishing Industry Research Institute put a team of eight scientists and technicians on to the project. They had five basic problems to solve: (1) the right type of fish had to be found, (2) the process had to be adaptable for large scale production, (3) the flour had to go into enriched bread in a proportion of at least 4 p.c. without affecting the taste, smell, or color, (4) the protein of the enriched bread had to have the highest possible biological value, and (5) the flour had to remain neutral even if stored for long periods.

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7.43 FAT AND MOISTURE CONTENT (DETERMINATION)

Anonymous
National Provisioner 134, 12-13, 22-24 (January 21, 1956)

A rapid method for determination of fat and moisture in meat products is described. Moisture and oil are extracted by means of a solvent which forms an azeotropic mixture with the water. The extraction is carried out with a mixture of 7 parts of capryl alcohol (2-octanol) and 1 part of octyl alcohol (1-octanol) in a modified Dean-Stork equipment (see figure, right).

The volume of the distilled water is measured and the fat content of the alcoholic extract determined by measurement of dielectric constant in a commercial fat testing instrument. Temperature corrections and conversion factors have been worked out for use with the now solvent mixture. Results comparing those obtained by the new quick procedure with conventional methods are shown in table 1, over.

Complete details of the procedure with tables of dielectric readings are given in Bulletin No. 26, American Meat Institute Foundation entitled "Fat and Moisture -- Rapid Methods for Determination of Fat and Moisture Content in Meat Products".

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 ABSTRACTER: Maurice E. Stansby

INORGANIC GROWTH FACTOR

SEAWEED IN ANIMAL FEEDS

FISH FLOUR

RAPID OIL AND MOISTURE DETERMINATION

6.3

found no significant difference in the growth rate or carcass quality of pigs receiving comparable rations without seaweed meal or with 2, 4, or 6 percent meal in the ration.

Rats.--Feeding trials with rats at Rowett Research Institute showed that Laminarin and sodium alginate were equal to starch when fed at the 8 and 16 percent level. Mannitol and fucoidin, although not statistically significant, were inferior at the 8 percent level and significantly inferior at the 16 percent level. Rhodymenia palmata protein fed to rats to determine the biological value of algal proteins gave a Net Protein Utilization (N.P.U.) value of 42. This value compares favorably with the N.P.U. value of peas and oil cake meals.

Cows.--In the rations of dairy cows, only laminarin separately or in the whole weed was utilized by the rumen bacteria. Ascophyllum nodosum contained a substance that retarded the utilization of maltose in the rumen. The inclusion of 200 grams of seaweed meal per cow per day on a number of farms produced a significant increase in the butterfat content of the milk.

Sheep.--In feeding trials in which 20 to 24 percent of the basal diet of sheep was replaced with seaweed meals, Ascophyllum meal was poorly digested and even detrimental to the protein in the basal diet, whereas Laminaria saccharina meal was readily digested to the extent of 54.1 percent of its crude protein and 71.8 percent of its N-free extractives.

Pigs.--Digestibility trials with pigs at Rowett showed that as with sheep, the digestibility of Ascophyllum meal is considerably lower than that of Laminaria saccharina. At Edinburgh and East of Scotland College of Agriculture Ascophyllum meal was used to replace 5 percent of barley meal on a pound for pound basis in the diet of pigs in the weight gain range of 50 to 90 pounds and 12 percent of barley meal in the weight range above 90 pounds without affecting the growth rate or the quality of the bacon.

Poultry.--Replacement of 10 percent of the basal ration of one-year-old Rhode Island Red hens with high ash and low ash Laminaria meals or with an Ascophyllum meal had no ill effects on the hens or on egg production. At 20 percent of the basal ration, however, these meals upset the metabolism of the birds.

7.43 (Cross Reference 7.53)

Table 1.--Comparison of Rapid and Official Methods for Determination of Fat and Moisture in Meat Products
(1-octanol, 2-octanol -- 1:7; 15 gram sample)

Meat Product	Sample No.	Pct. Fat		Pct. Moisture	
		Rapid Method	Ether Extraction	Rapid Method	Oven Drying*
Ground Beef		10.7	13.0	66.7	67.2
Beef Trimmings		52.0	54.4	34.7	36.7
Wieners	1	25.2	25.4	58.7	59.0
	2	23.0	22.9	57.3	59.9
	3	24.3	23.3	57.3	58.2
	4	17.3	16.9	64.0	64.3
Bologna	1	25.0	26.7	58.7	57.6
	2	25.3	24.9	57.3	57.8
	3	24.7	26.9	57.3	57.5
	4	15.3	16.9	65.3	64.1
Pork Sausage	1	46.0	46.2	41.3	42.7
	2	36.0	35.6	49.3	50.8
	3	41.3	42.6	43.3	45.4
	4	46.7	46.5	37.3	39.4
	5	45.7	46.7	41.3	40.4
	6	48.0	45.4	41.3	41.8
Pork Lunch Meat	1	25.7	24.6	57.3	57.0
	2	36.0	35.4	46.7	47.7
	3	37.3	37.1	45.3	46.7

*Air oven at 100° C. for 16 hours.

6.193

constant weight. The ash was added to the basal ration at a level equivalent to 3 percent distillers dried solubles.

Results.--A 31 percent growth response was obtained in chicks that received the basal diet supplemented with distillers dried solubles, whereas only a 16.7 percent growth response was obtained in chicks that received the basal diet supplemented with distillers dried solubles ash. Aluminum, phosphorous, fluorine, arsenic, sulfur, cobalt, lead, and potassium were tested to further determine the action of the distillers dried solubles ash in promoting growth and found to be without effect.

Supplementation of the basal ration with calcium at a level of 0.5 percent of the ration resulted in a reduction in growth. Supplementation of the basal ration with calcium at a level of 0.5 percent and with distillers dried solubles at levels of 3.0 percent and 10.0 percent produced rate of growth increases of 54 and 64 percent respectively. These responses correspond to increases of 36 and 46 percent, respectively, over the responses obtained with the basal ration, which contained 1.08 percent calcium. The authors conceive, therefore, that distillers dried solubles contain a factor that is associated with the utilization of calcium by the chick.

6.54

In two years they solved each of these problems. They experimented on five main avenues of approach, and each of these approaches involved trying dozens of variations.

At first, experiments were conducted with both the pilchard and the maasbanker. But, although the pilchard did yield a flour neutral in taste and smell, it gave an unattractive dull color to the bread. The maasbanker behaved very much better, so the experiments were finally concentrated on this fish.

The flour, which we examined at the FIRI laboratories, reveals no trace of its fish origin, and is a completely neutral product with a protein content of the order of 80 p.c., retaining minerals but no vitamins. It has been so developed that the amino acids in the fish protein will be complementary to the amino acids in the wheat of the bread.

7.80 MEAT TENDERIZATION. I. TWO MECHANICAL DEVICES FOR MEASURING TEXTURE

Miyada, D. S. and Tappel, A. L. (Department of Food Technology, University of California, Davis, California)
Food Technology 10, 141-144 (March 1956)

Resistance to grinding and shearing is considered an index of texture. Two methods for evaluating texture differences are discussed on the basis of experimental data.

A Christel Texturemeter was modified by the addition of an electric motor and reduction gears. Samples of beeswax at five different temperatures were used to standardize the instrument. Shear force as a function of sample thickness was investigated using sections of two precooked semitendinosus muscles of beef. Readings of force in pounds, together with distance measurements attained from the known speed of the motorized drive and recorded time intervals, allowed work diagrams to be plotted and their areas evaluated with a planimeter. Calculated values for total work and maximum shear force were considered a function of texture.

A Hamilton-Beach food mixer, equipped with a power unit, grinder, and a 36-hole grinder plate was connected in series with an A. C. ammeter. 150 grams of parowax, each aliquot weighing 2 grams, was fed into the grinder at a uniform rate while ammeter readings were recorded at 5-second intervals. The ammeter values were plotted as a function of time in seconds and the area under the curve was attained as previously described. By a consideration of voltage and sample weight this value was converted to energy per unit-weight of sample. The precision of the grinder was evaluated by this procedure.

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 ABSTRACTER: Donald C. Malins

9.7 NORWAY'S SUCCESS IN FISHERMAN'S VOCATIONAL TRAINING

Anonymous
Canadian Fisherman 43, 19-20 (January 1956)

Norway's five state-operated vocational schools for fishermen have started a new year with full enrollment. Widely recognized to be among the most up-to-date in the world, the schools provide intensive courses lasting 5 to 10 months. The schools are located at Aukra, outside the western port of Molde; Floro, the only township in the Sognefjord; Laksevag, a suburb of Bergen; Langstranden, in northern Norway, and in the fast growing fishing port of Honningsvag in Finnmark. The 5 boarding schools have a total of 240 students. One hundred and twenty of them take the head fisherman course, 60 the motor tender course, and 60 the cooking course.

Supported by the city of Oslo and the Parliament, the Honningsvag school is the most modern of all. The school has 3 buildings; the Machinery Hall, which is equipped with a variety of motors and electronic instruments used in fishing vessels; the Main Building, which has a large kitchen for training cooks, a command bridge on the roof for navigation practice a dining room and recreation facilities; and the dormitory which houses the 60 pupils.

The 10-month head fisherman's course trains the students to pass the Fisheries Examination and the Coastal Master's Examination. Radio-telephony and the use of such electronic instruments as sonar (asdic) and depth sounders is taught. The 5-month cooking course trains galley crews for the fishing fleet. The motor course is also 5 months long.

Students of all schools receive free room and board, free tuition and travel between their homes and the school. Textbooks are the only expense of the student.

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 ABSTRACTER: Lois Elgin

9.6 FISH SAVING

Cutting, C. L. (Humber Laboratory, British Government)
Philosophical Library, Inc., New York

A connected picture of the evolution of fish preservation methods is presented in the book, Fish Saving, by C. L. Cutting. The curing of fish, one of our most important foodstuffs, is traced from earliest records to present day practices. Possible future developments are also considered.

Preservation by drying, salting, smoking, canning, chilling, and freezing is discussed within its historical context. Contemporary documents and literature were used as references. The relationship between technique and social and technological background is emphasized in describing the course of development. Sixty illustrations, many of them in color, are included. An index of the species of fish is also presented.

The chapters' subject matter includes:

Chapter 1 Antiquity
Chapter 2 Fish in Pre-industrial Times
Chapter 3 Salt Pickled Herring
Chapter 4 Red Herrings, Bloaters, Pilchards, and Salmon
Chapter 5 The Rise of the British Herring Fishery
Chapter 6) White Fish Salting and Drying
Chapter 7)
Chapter 8 The Canning of Fish
Chapter 9) Distribution of Fish
Chapter 10)

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 ABSTRACTER: Lois Elgin

9.7 INDUSTRY NEEDS TECHNICALLY TRAINED MEN

Anonymous
National Fisherman 36, 5 (November 1955)

Vocational and academic training in the commercial fisheries has received growing attention and action in several fishery producing nations. Educational courses for fishermen have been inaugurated recently in Newfoundland and the Netherlands.

In Norway the development of schools to furnish vocational training for fishermen was started after Norway's liberation at the end of World War II. Since then, the increasing economic importance of the country's fisheries, coupled with the introduction of complicated gear and electronic devices, such as purse-seines and sonar, has made it necessary to build more schools.

Norway now has five State-operated vocational training schools for fishermen, which provide intensive courses, lasting from 5 to 10 months. They have 240 students, of whom 120 take the head fisherman course, 60 the motor tender course, and 60 the cooking course.

Writing in the Oslo newspaper Aftenposten, Dr. Trygve Braarud observes in part: "To conduct profitable fisheries is today a question of technical know-how. That requires knowledge of fishing vessels and their motors, radiotelephony and other electronic devices, winches, purse-seines and trawls, as well as the mechanical aspects of fish transport. The education provided at Norway's five vocational training schools for fishermen is of direct use on the fishing banks. But, perhaps almost as important, is the introduction to the natural basis for our fisheries. For the fishermen learn not only about motor tending, navigation and cooking, but also about marine plant life, the biology of the various fish species, fish migrations, and fluctuations in the supply of fish.

"Our scientists realize the importance of passing on trade information to the fishermen. Today, ocean researchers give frequent lectures in coastal towns and fishing ports. Many of these talks are accompanied by documentary films showing the latest scientific achievements."

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TEXTURE MEASUREMENT

FISH PRESERVATION

FISHERIES VOCATIONAL EDUCATION

EDUCATION FOR FISHING

9.6 (Cross Reference: 3.00)

Chapter 11 The Development of the Mildly Smoked Fish
Chapter 12 Freezing of Fish
Chapter 13 Fish Meal and Dehydration
and Chapter 14 The Future

9.7

Since 1940, Portugal has had a fish school system which includes elementary fishery schools, as well as a professional school that accommodates 100 boys. The ages of the boys in the professional school are from 16 to 18 years; after serving an apprentice course for one year, they are placed aboard a cod fishing schooner, either a hand line or trawler boat, which operates on the Grand Banks or off the coast of Greenland.

The Master of the cod fishing vessel must report with respect to the behavior of the students during a six-month period, and if they have promise an additional two years of fishing experience follows, after which they can qualify for a boatswain's course. This leads to a Harbor Master Certificate or to a certificate as Master of a fishing vessel.

By continually relaying the latest research results to the working fishermen, vocational schools and other educational facilities will be able to stimulate further growth of the industry. This program requires close cooperation among trade organizations, government agencies and private institutions.

7.80

The applicability of this technique to meat texture was investigated by applying pressure cooked, rehydrated, freeze-dried samples of biceps femoris of beef to the grinder. Rehydration was undertaken in the following solutions: 1 percent papain, 0.1 percent papain, 1 percent commercial meat tenderizer, and water which served as a control.

The methods described above are considered more accurate than the popular Warner-Bratzler Shear by virtue of a coefficient of variation of 2 percent for successive runs.

9.7 (Cross Reference: 1.0141)

The increasing importance of Norway's fishing industry since World War II and the increase of scientific gear has made it necessary to build more schools.

Dr. Trygve Braarud, professor of marine biology at Oslo University, states that the fishermen's training provided in Norway's 5 schools is on a higher level than in any other country. In addition to this training, leading ocean researchers give lectures in coastal towns and fishing ports. The fishermen and trainees show high interest in technical and trade questions.

The Society for the Promotion of Norwegian Fisheries sponsors a broad educational program to acquaint the general public with fisheries. Launched by the Society, a program for advanced study in administrative work, industry, and research is now being offered university graduates. The Society also maintains the Bergen Museum of Fisheries, which is one of the most modern of its kind in the world.

Dr. Braarud also believes that Norway's success in relaying the latest research information to the working fisherman is due to the cooperation among fisheries trade organizations, government agencies, and private organizations.

2.119 IDEAS FOR LOWERING BOAT INSURANCE COSTS

Sachs, Jerome
National Fisherman 37, 13, 40, 41 (March 1956)

An acute problem is developing due to the rising cost of fishing vessel insurance and the growing reluctance on the part of insurance companies to provide the needed protection.

Claims levied against insurance companies have risen due to the rising cost of vessel construction and repairs to vessels and gear as well as to the fact that court awards to fishermen for personal injury claims have increased sharply.

About one-quarter to one-third of the major assistance to vessels by the Coast Guard involves assistance to commercial fishing craft. Approximately one-half of the fishing vessels assisted in 1955 were either over 30 tons burden or above 40 feet in length.

A rough estimate places one-quarter to one-third of the accidents to vessels as due to undetermined causes, less than one-quarter are attributed to heavy weather; over one-half are attributed to personnel and material failures.

Some insurance companies are now insisting on a complete physical survey of the vessel by a marine surveyor. The survey also includes inspection of navigation, fire fighting and lifesaving equipment. On occasion these inquiries have even included checking on the general reputation of the vessel's operating personnel.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

3.19 IRRADIATION PRESERVATION OF FOOD

Thomas, Frank B.
Canner and Freezer 122, 13-15 (March 5, 1956)

There are five methods of food preservation currently possible. These are (1) thermal processing, (2) freezing, (3) dehydration, (4) chemical preservation, and (5) cold sterilization or irradiation. Research on cold sterilization or irradiation has rapidly increased during the past decade.

There are two main sources of radiation; those classed as radioactive sources such as cobalt 60 and fission products from nuclear reactions, and ionizing radiation produced by accelerators such as the electrostatic generator and the resonant transformer.

Several factors should be considered in the irradiation of foods. These include: (1) potential danger, (2) adoption of radiation producing equipment to line operation, and (3) the power level of the equipment to be used.

The cost of irradiating according to present estimates is extremely high -- the cost per canned item is estimated to be approximately twice that of ordinary heat processed foods. However, methods are being improved as research progresses.

There are two theories as to the mechanism of the radiochemical reaction in irradiated foods. The "direct action" theory concerns the destruction or alteration of the microorganism when exposed to radiation while the "indirect action" theory states that free radicals or activated molecular or ions are produced that affect the foods. Both of these theories may be valid.

(over)

 ABSTRACTER: R. W. Nelson

2.8 FISH IS FINE FARE

Bricker, A. June
Co-Ed 1, 23, 41, 50 (March 1956)

Fish and shellfish make delightful eating yet many of us think of fish as being served on Friday or at a clam bake or fish fry. Americans are largely unacquainted with the possibilities of the 160 varieties of seafood sold in the United States.

Students as well as others are usually familiar only with such standard preparations as tuna salad, fried filet of sole, and shrimp salad. Teachers who strive to change the students' point of view must have enthusiasm as well as knowledge of the subject. The closely related subjects of food habits, meal planning,and meal preparations are important in teaching.

Fish in all forms -- fresh, frozen, canned, and salted -- provide high quality protein suitable for main dishes. In addition to high quality protein, the iodine content in fish is valuable. Iodine helps prevent simple goiter. Although meat has more iron than fish, the iron content of fish deserves more attention than it has received. Iron is important to people of all ages, particularly adolescents.

Fish brings a delicacy of flavor and texture to a wide variety of main dishes. There are differences in flavor, appearance, texture, number of bones, and size of the various species, but there are few fish cookery rules. The variation in fat content is the only fundamental difference that decides the cooking technique. Fat fish, such as salmon and mackerel, is best broiled or baked because their fat content will prevent them from becoming dry. The lean fish, such as cod, haddock, pike, and yellow perch are preferred for boiling and steaming as the flesh is firm enough not to fall apart. Lean fish is better for chowders also. The medium fat fish include weakfish, brooktrout, mullet, and white perch. Many fish are suitable for frying, but lean fish is preferred.

(over)

 ABSTRACTER: Lois Elgin

3.26 OPPORTUNITIES IN FROZEN FOOD MARKETING

Rogers, Curtis
Quick Frozen Foods 18, 59-62, 196, 200 (March 1956)

The total production of frozen foods doubled in the 5-year period 1945 to 1950, and then doubled again between 1950 and 1955 (see chart 1 , over).

Frozen vegetables, poultry, and seafoods nearly doubled in the 1950-55 period. Frozen orange juice nearly tripled in volume, and specialties increased nine-fold. Although frozen meats tripled in volume during this five-year period, many expect to see this segment of the frozen food industry expand most rapidly during the next five years.

Surveys show that more than half of the families in the United States are now regular users of frozen foods.

Three years ago the frozen food industry was still short of a billion dollar annual home consumption volume. In 1955 consumers spent an estimated $1 3/4 billion for frozen foods for home consumption.

One limitation on the expansion of the frozen food industry is the opportunity that families have to buy frozen foods. This in turn is limited by the amount of zero cabinet space available. If frozen foods are not available in the grocery store, consumers are unable to buy them.

According to a survey,there has been an increase in the average footage of cabinet space per grocery store from 24 feet in 1953 to 40 feet in 1955. The retailers participating in the survey said

(over)

 ABSTRACTER: Kathryn L. Osterhaug

FISHING VESSEL INSURANCE

FISH IN THE DIET

IRRADIATION PRESERVATION

MARKETING FROZEN FOOD

2.8

The important shellfish group includes mollusks: oysters, clams, scallops, and mussels. The crustaceans include lobster, crab, shrimp, prawns, and crayfish.

Different kinds of fish and shellfish vary greatly in the cost per pound. The season, local supply, and buyers' preference controls the price. Fish is often an economical buy.

Those who live near the water where fish is readily available have more opportunity to develop a liking for fish and learn a variety of ways to prepare it. However, no one is deprived of fish as frozen fish is available to all inlanders. Frozen fish has the advantages of variety the year round, no waste or prepreparation. Canned fish is also convenient and economical.

Most fish market dealers would be glad to talk to students about the various kinds of fish on the market. The Fish and Wildlife Service is very willing to supply excellent educational materials on fish.

Recipes for shrimp, salmon casserole, and baked stuffed fish are included.

2.119 (Cross Reference: 9.3)

The practical question which those interested in the general welfare of the fishing industry and in its insurance difficulties have to answer, is what should be done to get vessel owners to maintain the vessel, its fixed equipment and safety equipment in good condition. What action should be taken to reduce accidents? Are corrective regulatory safety measures needed?

One suggestion is that Congress should take fishermen out of the Jones Act and enact a fishermen's compensation act to parallel the workmen's compensation legislation that governs the compensation for death and injuries to workmen in industrial plants.

Another method for dealing with this problem is that commercial fishing vessels should be made subject to Government construction and maintainance standards. The aim of these official standards would be to insure that the commercial fishing vessel is seaworthy, properly equipped for safe navigation, properly equipped with firefighting apparatus and lifesaving gear, and properly manned. This course of action would make fishing vessels subject to approximately the same regulations as passenger and cargo vessels.

At present, fishing vessels are subject only to the requirements of the Motorboat Act administered by the Coast Guard. These regulations are limited to requiring compliance with rules concerning navigation lights, fire extinguishers and lifejackets. The Act also requires that officers of seagoing vessels of over 200 tons be licensed, and a fishing vessel of that tonnage would be subject to this requirement.

In an effort to control accidents and losses on fishing vessels, many maritime nations have put into effect laws and regulations governing construction, maintenance, and safety of operations of fishing vessels.

If laws extending to inspection and safety requirements of fishing vessels are ever adopted in the United States, the system should be reasonable and have as its objective the retention of the bulk of equipment now used by the fishing industry while making it safer for the men. Regulatory measures should not place an undue economic burden on the commercial fishing boat owner. Details of any such regulation should be worked out in consultation with the fishing industry.

3.26

that they needed, on an average, nearly double the cabinet space -- or 79 feet -- to do an adequate merchandising job on frozen foods.

The following key reasons account for the rapid expansion of frozen foods: (1) the frozen food industry has produced products that are of superior quality, (2) these products are convenient to use, and (3) they are reasonably priced and represent a good value to the consumer.

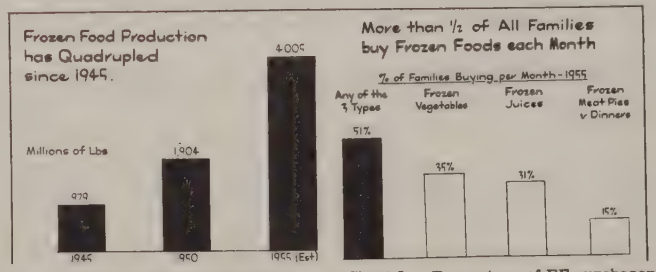

Chart 1. --Rate of increased production.

Chart 2. --Percentage of FF purchasers.

3.19

A number of effects of radiation must be considered in food irradiation. Off flavors produced by free-radicals are frequently encountered.

The dose level required to destroy different molds and bacteria varies considerably. Man is more easily affected by radiation whereas viruses and enzymes require a larger dose level than molds and bacteria.

Further considerations in processing include concentration of microorganisms, species radiosensitivity, the influence of the medium, the temperature, atmosphere, age of cells, uniformity of ionization, sterility testing, and packaging material.

Meat products that may be irradiated commercially in the near future include hot dogs, hamburger, and cold-cuts. Sterilization of canned meats requires further investigation. Fruits and vegetables have been irradiated with high voltage cathode rays. Most were adversely affected in texture and flavor.

Tests are being conducted to determine the nutritional status, toxicity levels, induced radiation, and other related factors in irradiated foods. Recent reports indicate foods were wholesome when treated with dose levels up to six million reps.

Estimates of when irradiation will be used to any extent by processors vary from one to many years.

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Editorial Clerk (Typist)--Betty Anne Brookbank

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